

CLAIMS:

1. An image processing method comprising the steps of:
with each pixel constituting an image defined as a pixel of interest,
5 determining a variance of pixel values in a local region to which said pixel of interest belongs; and
maintaining the pixel value of said pixel of interest when said
determined variance is significantly larger than a variance of noise,
otherwise suppressing the pixel value of said pixel of interest.
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2. An image processing method comprising the steps of:
with each pixel constituting multi-slice images defined as a pixel
of interest, determining a variance of pixel values in a local region to which
said pixel of interest belongs;
15 performing pixel value adjustment involving maintaining the pixel
value of said pixel of interest when said determined variance is significantly
larger than a variance of noise, otherwise suppressing the pixel value of said
pixel of interest; and
performing maximum intensity projection on the multi-slice
20 images subjected to said pixel value adjustment.
3. An image processing method comprising the steps of:
with each pixel constituting multi-slice images defined as a pixel
of interest, determining a variance of pixel values in a local region to which
25 said pixel of interest belongs;
adding to said determined variance a variance of pixel values in a
local region to which a corresponding pixel of interest in an image of a
neighboring slice belongs;
performing pixel value adjustment involving maintaining the pixel
30 value of said pixel of interest when said added variance is significantly larger
than a variance of noise, otherwise suppressing the pixel value of said pixel
of interest; and
performing maximum intensity projection on the multi-slice
images subjected to said pixel value adjustment.

4. The image processing method according to any one of claims 1 — 3, wherein said suppression of the pixel value is performed by multiplying by a coefficient less than one.

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5. The image processing method according to any one of claims 1 — 3, wherein said suppression of the pixel value is performed by subtracting a predefined numeric value.

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6. An image processing method comprising the steps of:
with each pixel constituting an image defined as a pixel of interest,
determining a variance of pixel values in a local region to which said pixel of interest belongs; and

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enhancing the pixel value of said pixel of interest when said
determined variance is significantly larger than a variance of noise,
otherwise maintaining the pixel value of said pixel of interest.

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7. An image processing method comprising the steps of:
with each pixel constituting multi-slice images defined as a pixel
of interest, determining a variance of pixel values in a local region to which
said pixel of interest belongs;

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performing pixel value adjustment involving enhancing the pixel
value of said pixel of interest when said determined variance is significantly
larger than a variance of noise, otherwise maintaining the pixel value of said
pixel of interest; and

performing maximum intensity projection on the multi-slice
images subjected to said pixel value adjustment.

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8. An image processing method comprising the steps of:
with each pixel constituting multi-slice images defined as a pixel
of interest, determining a variance of pixel values in a local region to which
said pixel of interest belongs;

adding to said determined variance a variance of pixel values in a
local region to which a corresponding pixel of interest in an image of a

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neighboring slice belongs;

performing pixel value adjustment involving enhancing the pixel value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

9. The image processing method according to any one of claims 6 — 8, wherein said enhancement of the pixel value is performed by multiplying by a coefficient equal to or greater one.

10. The image processing method according to any one of claims 6 — 8, wherein said enhancement of the pixel value is performed by adding a predefined numeric value.

11. The image processing method according to any one of claims 1 — 3 and 6 — 8, further comprising the step of: determining a residual sum of squares of pixel values for each of a plurality of local regions defined over the entire image; determining a histogram of said residual sums of squares; and then determining said variance of noise based on a residual sum of squares that gives a peak of said histogram.

12. The image processing method according to any one of claims 1 — 3 and 6 — 8, wherein said image is a blood flow image.

13. An image processing apparatus comprising:
a variance calculating device for, with each pixel constituting an image defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs; and
a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest.

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14. An image processing apparatus comprising:

a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

15. An image processing apparatus comprising:

a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

an adding device for adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

16. The image processing apparatus according to any one of claims 13 — 15, wherein said pixel value adjusting device performs said suppression of the pixel value by multiplying by a coefficient less than one.

17. The image processing apparatus according to any one of claims 13 — 15, wherein said pixel value adjusting device performs said

suppression of the pixel value by subtracting a predefined numeric value.

18. An image processing apparatus comprising:

5 a variance calculating device for, with each pixel constituting an image defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs; and

10 a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest.

19. An image processing apparatus comprising:

15 a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

20 a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

20. An image processing apparatus comprising:

25 a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

30 an adding device for adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

5 21. The image processing apparatus according to any one of claims 18 — 20, wherein said pixel value adjusting device performs said enhancement of the pixel value by multiplying by a coefficient equal to or greater one.

10 22. The image processing apparatus according to any one of claims 18 — 20, wherein said pixel value adjusting device performs said enhancement of the pixel value by adding a predefined numeric value.

15 23. The image processing apparatus according to any one of claims 13 — 15 and 18 — 20, further comprising:

as a device for determining said variance of noise, a noise variance calculating device for determining a residual sum of squares of pixel values for each of a plurality of local regions defined over the entire image; determining a histogram of said residual sums of squares; and then
20 determining said variance of noise based on a residual sum of squares that gives a peak of said histogram.

24. The image processing apparatus according to any one of claims 13 — 15 and 18 — 20, wherein said image is a blood flow image.

25 25. A recording medium for being recorded in a computer-readable manner with a program for causing a computer to implement the functions of:

30 with each pixel constituting an image defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs; and

maintaining the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest.

26. A recording medium for being recorded in a computer-readable manner with a program for causing a computer to implement the functions of:

5 with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

 performing pixel value adjustment involving maintaining the pixel value of said pixel of interest when said determined variance is significantly
10 larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest; and

 performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

15 27. A recording medium for being recorded in a computer-readable manner with a program for causing a computer to implement the functions of:

 with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which
20 said pixel of interest belongs;

 adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

 performing pixel value adjustment involving maintaining the pixel
25 value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel of interest; and

 performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

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28. A recording medium for being recorded in a computer-readable manner with a program for causing a computer to implement the functions of:

 with each pixel constituting an image defined as a pixel of interest,

determining a variance of pixel values in a local region to which said pixel of interest belongs; and

enhancing the pixel value of said pixel of interest when said
determined variance is significantly larger than a variance of noise,
5 otherwise maintaining the pixel value of said pixel of interest.

29. A recording medium for being recorded in a computer-readable manner with a program for causing a computer to implement the functions of:

10 with each pixel constituting multi-slice images defined as a pixel
of interest, determining a variance of pixel values in a local region to which
said pixel of interest belongs;

performing pixel value adjustment involving enhancing the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

20 30. A recording medium for being recorded in a computer-readable
manner with a program for causing a computer to implement the functions
of:

with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which
25 said pixel of interest belongs;

adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

performing pixel value adjustment involving enhancing the pixel value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

31. An imaging apparatus for producing an image based on signals collected from an object, comprising:

5 a variance calculating device for, with each pixel constituting an image defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs; and

a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel
10 of interest.

32. An imaging apparatus for producing an image based on signals collected from an object, comprising:

15 a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise suppressing the pixel value of said pixel
20 of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

25 33. An imaging apparatus for producing an image based on signals collected from an object, comprising:

a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

30 an adding device for adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

a pixel value adjusting device for maintaining the pixel value of said pixel of interest when said added variance is significantly larger than a

variance of noise, otherwise suppressing the pixel value of said pixel of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

34. An imaging apparatus for producing an image based on signals collected from an object, comprising:

a variance calculating device for, with each pixel constituting an image defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs; and

a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest.

35. An imaging apparatus for producing an image based on signals collected from an object, comprising:

a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said determined variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

36. An imaging apparatus for producing an image based on signals collected from an object, comprising:

a variance calculating device for, with each pixel constituting multi-slice images defined as a pixel of interest, determining a variance of pixel values in a local region to which said pixel of interest belongs;

an adding device for adding to said determined variance a variance of pixel values in a local region to which a corresponding pixel of interest in an image of a neighboring slice belongs;

5 a pixel value adjusting device for enhancing the pixel value of said pixel of interest when said added variance is significantly larger than a variance of noise, otherwise maintaining the pixel value of said pixel of interest; and

10 a maximum intensity projecting device for performing maximum intensity projection on the multi-slice images subjected to said pixel value adjustment.

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